CLAIMS

What is claimed is:

1. An Implantable Cochlear Stimulation (ICS) system including envelope based amplitude mapping, comprising:

an implantable part including an electrode array; and

a speech processor including a microphone and a signal processor, wherein the microphone converts acoustic energy into an electrical signal provided to the signal processor, and wherein the signal processor includes:

means for filtering the electrical signal to generate at least one filtered signal;

means for computing at least one envelope signal from the at least one filtered signal;

means for computing at least one decimated signal from the at least one signal envelope;

means for computing at least one mapped signal from the at least one decimated signal; and

means for computing at least one output signal from the at least one mapped signal and the at least one filtered signal.

2. The system of Claim 1 wherein the means for computing at least one output signal comprises multiplying the at least one mapped signal times the electrical signal to generate an output signal for the electrode array.

3. The system of Claim 1 wherein the means for computing the at least one mapped signal comprises a mapping function F'(x), wherein F'(x) is F(x) / x, and wherein x is the decimated signal, and wherein F(x) is the desired

mapping between the at least one filtered signal and the at least one output signal.

4. The system of Claim 1 wherein F(x) is a compressive mapping of x.

5. The system of Claim 1 wherein the compressive mapping of x is a log mapping.

6. The system of Claim 1 wherein the means for filtering the electrical signal comprising a family of at least one parallel band pass filter.

7. The system of Claim 1 wherein the means for computing at least one envelope signal comprises a full wave rectifier followed by a lowpass filter.

8. An Implantable Cochlear Stimulation (ICS) system including:
a microphone
a speech processor; and
an electrode array;
wherein the speech processor includes at least one filter and at least one compressive mapping, wherein the microphone converts acoustic energy into an electrical signal, and wherein the at least one filter processes the electrical signal to generate at least one filtered signal and wherein the compressive mapping includes means for converting the at least one filtered signal into at least one output signal, wherein the compressive mapping is performed at a reduced rate.

9. The system of Claim 8 wherein:
the at least one filter is at least one bandpass filter, and

the compressive mapping comprises envelope based compressive mapping including:

at least one envelope detector;

at least one decimator;

at least one compressive mapper; and

at least one multiplier,

wherein the at least one envelope detector converts the at least one filtered signal into at least one envelope signal, and wherein the at least one decimator converts the at least one envelope signal into at least one decimated signal, wherein the at least one decimated signal is at a lower data rate than the at least one envelope signal, and wherein the compressive mapper converts the at least one decimated signal into at least one mapped signal, and wherein the multiplier multiplies the at least one mapped signal times the at least one electrical signal to generate the at least one output signal.

10. The system of Claim 8 wherein:

the at least one filter is at least one bandpass filter, and

the compressive mapping comprises:

a second bin averager;

a third bin averager;

a log mapper; and

a multiplier;

wherein:

the second bin averager averages the filtered signal to generate a second averaged signal;

the third bin averager averages the second averaged signal to generate a third averaged signal;

the log mapper compressively maps the third averages signal to generate a mapped signal; and

the multiplier multiplies the mapped signal times the second averaged signal to generate the output signal.

11. The system of Claim 10 wherein:

the second averaged signal is at a data rate of about 800 Hz;

the third averaged signal and the mapped signal at a data rate of about 100 Hz; and

the output signal is provided to a pulse generator.